APPENDIX G

HAZARD ASSESSMENTS

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HAZARD ASSESSMENTS

Although the probability of a significant accident or unintentional release of an etiologic agent is low, hazard assessments are included in this EIS. These hazard assessments evaluate the range of possible consequences that could arise as the result of a mishap during operation of the proposed NBACC Facility. Mishaps include accidents – unplanned events, such as a spill of liquid containing etiologic agents – and incidents – intentional disruptions.

The hazard assessments are based on analyses presented in the following previous NEPA studies relevant to Fort Detrick:

- *Final Programmatic Environmental Impact Statement, Chemical and Biological Defense Program* (U.S. Army Medical Research and Materiel Command [USAMRMC], 2004);
- *Final Environmental Impact Statement for the Construction and Operation of an Integrated Research Facility by the National Institutes of Health at Fort Detrick, Maryland* (NIH and USAG, 2003);
- *Environmental Assessment for the Construction and Operation of an Animal Facility on Area A - Fort Detrick, Maryland* (USAMRMC, 2002);
- *Environmental Assessment of U.S. Army Medical Research Institute of Infectious Diseases* (USAMRMC, 2001);
- *Environmental Assessment of U.S. Army Medical Research Institute of Infectious Diseases* (U.S. Army Medical Research and Development Command[USAMRDC], 1991);
- *Final Programmatic Environmental Impact Statement, Biological Defense Research Program* (USAMRDC, 1989).

1. MAXIMUM CREDIBLE EVENT ANALYSES

For purposes of this EIS, maximum credible event (MCE) analyses have been applied to evaluate potential risks to human health and the environment resulting from laboratory accidents during operation of the proposed NBACC Facility (see AR 385-69). An MCE analysis is a realistic worst-case scenario that applies credible information about existing safeguards. MCE analyses are applied to assess the range of possible consequences that could arise as the result of a mishap, based on the effectiveness of existing safeguards – engineering controls, design features, and standard operating procedures – that prevent the release of etiologic agents.

The MCE analyses discussed below were developed for Environmental Impact Statements (EISs) for the NIAID IRF (NIH and USAG, 2003) and the Department of Defense (DoD) Chemical Biological Defense Program at USAMRIID (USAMRMC, 2004), neighbors of the proposed NBACC Facility. These MCE analyses used scenarios that represent the most extreme circumstances in a particular risk category, such as BSL-3 or BSL-4. The Hazard Prediction and Assessment Capability (HPAC) computer simulation model developed by the Defense Threat Reduction Agency (DTRA) was used to quantify the risk, using climate and topographic information site-specific for Frederick, Maryland, as required to model the impacts. Therefore, these MCE analyses are directly applicable for the proposed NBACC Facility.

The HPAC modeling software was developed to accurately predict the effects of hazardous nuclear, biological, and/or chemical material releases into the atmosphere and their impact on civilian or military populations resulting from conventional weapon strikes against potential target facilities by an enemy. It also has been used to model downwind hazard areas resulting from accidental releases of etiologic agents (DTRA, 2002).

The HPAC modeling software incorporates information from databases that provide site-specific weather and terrain information, atmospheric transfer models that calculate the dispersion of released material, and human effects models that quantify the effect of the released material on human populations. It utilizes very conservative assumptions, that is, it maximizes potential risks. By simulating a hypothetical mishap at the proposed NBACC Facility, this software can analyze calculated results for the release of an etiologic agent and plot the projected health impacts within a contoured area. For all scenarios analyzed in this EIS, twelve HPAC simulations were performed, each representing a particular calendar month, using historical meteorological data for that month in Frederick, Maryland.

Two scenarios were developed to illustrate potential exposure to highly infectious material for individuals outside the proposed NBACC Facility. The specific hypothetical laboratory mishap event initiating these scenarios, accidental leakage or breakage inside a centrifuge, generates larger volumes of biological aerosol and with higher kinetic energy than would be the case for other potential mishap events such as a spill. The MCE analyses evaluate the attenuation (i.e. dilution) of the aerosol by engineering controls within the biosafety laboratory before it reaches the discharge stack and by dispersion into the atmosphere. The amount of etiologic agent inhaled by an individual at ground level, i.e., the potential exposure, is then determined for various locations downwind from the discharge stack.

A. BIOLOGICAL AEROSOL RELEASES FROM A BSL-3 LABORATORY

An MCE analysis was developed for potential release of a biological agent resulting from work in BSL-3 facilities and evaluated for local meteorological conditions at Fort Detrick, Maryland (USAMRMC, 2004) (NIH and USAG, 2003). The MCE scenario for a BSL-3 laboratory accident occurs during the processing of a 1-liter (0.26 gallon) slurry containing *Coxiella burnetii*, an NIAID Category B agent and causative agent of Q fever, to prepare an experimental vaccine. The infective dose for this species of bacteria ranges from 1 to 10 organisms. During this process, a centrifuge rotor holding six 250-milliliter (8.45-fluid-ounce) polypropylene centrifuge tubes is fitted with O-rings; each tube contains 165 milliliters (5.58 fluid ounces) of slurry. The 990 milliliters (33.46 fluid ounces) of slurry contain a total of 9.9×10^{12} (9.9 trillion) human infective doses (HID_{50}) of the organism. One HID_{50} is the dose that infects 50% of exposed humans.

In this scenario, a laboratory worker fails to use rubber O-rings to seal the centrifuge tubes and fails to properly tighten the safety centrifuge caps designed to prevent leakage into the centrifuge compartment that houses the rotor. All six tubes spill slurry into the rotor cups, and some of this slurry leaks into the rotor compartment, which is not sealed against the release of organisms in a small-particle aerosol. It is assumed that 10% of the slurry spills, of which 1% leaks into the rotor compartment, where 0.1% of the leakage is aerosolized. It is further assumed that 90% of the aerosol settles as liquid droplets inside the chamber. Thus, 10% (spilled from tubes) x 1% (leaked from rotor cups) x 0.1% (aerosolized) x 10% (did not settle out) = 0.00001% of the original slurry placed in the centrifuge tubes for processing would be released into the room.

The most serious consequence of this laboratory accident would be the release of enough concentrated aerosol to override the air filter system, allowing the subsequent release of a significant number of infectious doses into the surrounding community. Following the assumptions above, 9.9 x 10^5 HID_{50} (0.00001% x 9.9 x 10^{12} HID_{50}) would be presented to the filter. Further assuming that the air filter system is 95% efficient, approximately 5 x 10^4 HID_{50} (5% not removed x 9.9 x 10^{12} HID_{50}) would be released to the atmosphere from the exhaust stack. Using a simple Gaussian plume dispersion model in HPAC with weather condition parameters for each calendar month, in the worst case the total exposure of a person breathing ground-level air would be less than 1 HID_{50} of *Coxiella burnetii* at a distance less than 2 meters (6.56 feet) from the stack. This concentration of organisms would pose no risk to human health. This release would not pose a hazard to the surrounding community, as the exhaust discharge stack port at the proposed NBACC Facility would be more than 1,500 feet from the fence surrounding Fort Detrick.

B. BIOLOGICAL AEROSOL RELEASE FROM A BSL-4 LABORATORY

Another MCE scenario was developed for a potential release of a biological agent resulting from a BSL-4 laboratory accident and evaluated for local conditions at Fort Detrick, Maryland (USAMRMC, 2004) (NIH and USAG, 2003). This scenario involves activities with the Ebola Zaire virus (USAMRMC, 2004). The HID of Ebola Zaire virus is unknown.

For the purposes of this MCE analysis, the highest volume used in centrifugation would be six 250-milliliter (8.45-fluid-ounce) bottles of cell culture supernatant that contain 10^8 PFUs per milliliter each, for a total of 1.5 x 10^{11} PFUs. Assuming that all six bottles break, a viral aerosol would be created within the rotor. It is also assumed that the rotor gasket fails to contain any aerosol generated. Most of the liquid in the bottles (approximately 97%) would be contained within the centrifuge rotor. Of the approximately 3% of the total liquid (45 milliliters [1.52 fluid ounces]) that emerges from the centrifuge rotor, approximately 10% would be aerosolized, and of the aerosolized fraction, 90% would settle as liquid droplets. Thus, approximately 0.03% of the total liquid volume (0.45 milliliters [approximately 0.015 fluid ounces]) containing 4.5 x 10^7 PFUs would leave the centrifuge in aerosol form.

This is an overestimate, since technicians and investigators do not fill bottles to the top to avoid spillage. The rotor in the centrifuge would be sealed by a gasket and, upon completion of centrifuging, the entire rotor would then be removed from the centrifuge and opened within a BSC.

Any potential aerosol from the centrifuge chamber would be exhausted through the duct system of the laboratory suite. The exhaust air passes through two HEPA filters (nominal efficiency of 99.97% each) in series. After passage through the first filter, 1.35 x 10^4 PFUs would remain. After passage through the second filter, 4.05 PFUs would discharge into the exhaust stack and be released into the atmosphere. Assuming no biological decay due to ultraviolet light exposure, heat, or humidity, the dispersion of the released aerosol in the worst case would result in a total exposure of 0.06 PFU at a distance much less than 1 meter (3.3 feet) from the exhaust discharge stack. This release would not pose a hazard to the surrounding community, as the exhaust discharge stack port at the proposed NBACC Facility would be more than 1,500 feet from the fence surrounding Fort Detrick.

Because laboratory work is normally performed during the day, ultraviolet rays from the sun would destroy or inactivate a large number of the virus particles potentially released. Other meteorological variables such as high wind speed, low humidity, and/or high temperatures would further accelerate the dispersion and biological decay of infective particles. Laboratory personnel would not have been exposed, since the aerosol should be contained within the BSC. However, they would receive an appropriate medical evaluation immediately following such an event.

2. ESCAPE OF AN INFECTED ANIMAL

The hazard analyses discussed below were developed for previous NEPA environmental analyses, including the EISs for the NIAID IRF (NIH and USAG, 2003), the DoD Chemical Biological Defense Program at USAMRIID (USAMRMC, 2004), and the Environmental Assessment for the new USAMRIID Animal Facility (USAMRMC, 2002), neighbors of the proposed NBACC Facility. Since these hazard analyses do not involve site-specific parameters, the results are directly applicable to the proposed NBACC Facility.

A. RODENTS AND LAGOMORPHS (RABBITS)

The likelihood of an infected animal escaping the proposed NBACC Facility would be remote. The design and construction of a BSL-3 or BSL-4 laboratory or an ABSL-3 or ABSL-4 animal facility minimizes potential modes of escape. Simultaneous breakdowns of multiple layers of procedural controls and barriers would need to occur for an infected animal to escape.

- An infected animal would first have to escape from its specially designed cage (primary barrier). That would be most likely to occur during transfer of the laboratory animal between cages, which is performed in an animal room. Or, a small animal might escape from its cage due to a faulty cage lid.
- The animal room (secondary barrier) has sealed floor, walls, and ceiling, and a tightly fitted closed door. Any escaped animal would be contained within the secondary enclosure. In either case, the animal caretaker would place a cage or net over top of the small animal, scoop it up, and place it in a separate cage. If an animal did manage to escape its cage and elude recapture, it would have difficultly leaving the animal room and gaining access to the laboratory suite corridor.
- If a small animal did escape out of the secondary enclosure into the suite corridor, it would still be contained within the building. No animal room opens to a hallway with a door that leads directly out of the building. Even if the animal managed to gain access through a hallway door, it would still have to reach an outside door. The outside doors are either locked or operated by security personnel.

Daily observations of the animals will be performed to further reduce the possibility of an escaped or missing animal going undetected. If a small animal such as a rodent did get loose in the building, traps would be placed throughout the building. Transportation of infected animals is kept to a minimum. Rodents and lagomorphs will enter the proposed NBACC Facility uninfected and never will be brought out of it. Therefore, *even if only* one of these multiple barriers would prevail, the animal would not be able to escape the facility.

In the highly unlikely event that an infected animal did overcome all of the barriers noted above and escape to the outside, it would be unlikely to survive. Most small laboratory animals, having been specially bred and maintained in ideal environments, do not have the experience or the genetic hardiness to survive outside the laboratory. Therefore, the probability of an escaped laboratory animal reaching a populated animal reservoir and making intimate contact with a susceptible host would be negligible.

B. NON-HUMAN PRIMATES

The design and construction of the proposed NBACC Facility will feature multiple control barriers similar to those employed in the new USAMRIID Animal Facility (USAMRMC, 2002) which will make it highly unlikely that a non-human primate (NHP) could escape outside the building. If a NHP escapes, two or three experienced personnel would go into the animal room to net it. The door would be kept closed at all times, and an alert would be sent out to the rest of the floor and building to keep doors closed and personnel out of the area until the NHP is caught and returned to its cage. Some personnel will be trained to use a dart gun to capture the NHP if it surmounts the primary barrier.

Caretakers, investigators, and veterinary technicians will observe the animals daily and they would notice a missing NHP. Furthermore, if a NHP does become loose in the room, the other NHPs would become quite noisy which would immediately alert the caretakers. If an animal did manage to escape its locked cage, it would have difficultly leaving the animal room and gaining access to the laboratory suite corridor. And if it managed to reach the corridor, there will be no doors that lead directly out of the NBACC Facility. The outside doors will be either locked or manned by security personnel.

Animal transportation will be minimized to lessen the possibility of an escape. The animal facilities and biosafety laboratories will be designed to minimize movement of NHPs. The mostly likely time that a NHP might escape would be during transfer between cages. The cages will be specially designed to prevent the NHPs from opening them. Procedures to minimize potential escape, for example, anesthetizing the NHP, will be employed for transporting NHPs between laboratory suites.

It is highly unlikely that a NHP could escape from the proposed NBACC Facility to the outside environment. *Even if only* one of the many control procedures and physical barriers prevails, the NHP would not be able to escape the building.

3. BIOLOGICAL MATERIAL SHIPMENT

The packaging, labeling, shipping, and transport of etiologic agents are regulated by 42 CFR 72 (*Interstate Shipment of Etiologic Agents*), 49 CFR 172 and 173 (U.S. Department of Transportation regulations concerning shipment of hazardous materials), 9 CFR 122 (*U.S. Department of Agriculture [USDA]-Restricted Animal Pathogens*), and International Air Transport Association rules. In addition, special rules apply for the transport of materials regulated by the U.S. Food and Drug Administration (21 CFR 312.120, *Drugs for Investigational Use in Laboratory Research Animals or in Vitro Tests*). Recent legislation (the *USA Patriot Act*) has further strengthened the regulations controlling transport of certain etiologic agents, referred to as select agents, to include controls over possession and use.

The proposed NBACC Facility will be registered with the CDC and USDA for possession, use, and transport of select agents. A responsible official will be designated and approved by the regulating agencies to oversee the shipping, receipt, and use of select agents. Standard Operating Procedures (SOPs) will be established to ensure that etiologic agents are prepared, packed, labeled, marked, and shipped in accordance with all the applicable federal, state, and local regulations. Private couriers will be used for transport of etiologic agents, rather than the U.S. Postal Service. BSL-4 agents or USDA-restricted animal pathogens will be accompanied by a courier or other responsible party assigned to monitor shipment and final receipt.

The quantities of potentially infectious material shipped during the conduct of research activities at the proposed NBACC Facility will be very small. Shipments of microliter-to-milliliter quantities of samples, which could include live microorganisms suspended in semi-solid agar culture media or frozen solid in culture media, would not be likely to result in an increase in human health risks to the public or the environment. The restrictive requirements for packaging of shipments involving infectious material are based on extensive drop, crush, and other rupture-causing testing events.

There have been no recorded cases of illness attributable to the release of infectious material during transport in the more than 60 years in which such activities have been performed in the U.S. (USAMRMC, 2004), although mishaps involving damage to the outer packaging of properly packaged materials have been reported (World Health Organization, 2002; U.S. Department of Transportation, 2001). Hazardous Materials Information System data (U.S. Department of Transportation, 2004) on accidents and resultant injuries or deaths during transportation of regulated materials 1993 through 2003 showed 604 accidents involving shipments of infectious substances, with a total of 25 associated minor injuries and zero associated major injuries or fatalities.

4. TERRORIST ACTS

Since the events of 11 September 2001 and the subsequent incidents of mailing anthrax spores, it is clear that the United States is vulnerable to significant acts of terrorism. However, terrorist attacks are not evaluated in NEPA analyses. There are at least two reasons for this. First, hazard analyses are performed to assess potential risks for *reasonably foreseeable* events. Although terrorist attacks may be credible threats, they are not reasonably foreseeable in that there are not enough historical data to extrapolate conclusions about either the probability of a potential terrorist act occurring at any given locale or the nature of such acts.

Second, and more importantly, potential terrorist acts are appropriately evaluated in a Vulnerability Assessment. USAG has conducted a local threat assessment study for Fort Detrick and the NIBC, as noted in Section 2.3.4.7 of the Draft EIS. DHS will conduct a Vulnerability Assessment to determine what, if any, security weaknesses exist for the proposed NBACC Facility as a basis for development of countermeasures. The Vulnerability Assessment and its associated details will not be available for public review, since that would make all security measures public knowledge and available to potential terrorists.

DHS recognizes that potential internal security risks, such as the threat from disgruntled employees, and theft and/or sabotage, may be perceived by members of the public. DHS will develop a biosurety program for the proposed NBACC Facility that will likely incorporate features of programs currently under development at USAMRIID, as described recently in the open literature (Carr *et al*, 2004). The program will address agent accountability, security, personnel reliability, and safety and is discussed in detail in Section 2.3.4.8 of the EIS.

5. EXTERNAL ACTS

Means of accidental release of biological test materials from a biodefense research facility include laboratory-associated mechanical failures, human errors, external accidents, and man-made or natural disasters. Theoretically, human error or multiple mechanical failures could lead to accidental release of biological test material. However, redundancy of safety equipment and procedures, operational safeguards, monitoring systems, and the overall excellent safety record of chemical and microbiology laboratories suggest that this is not a significant risk.

In the event of a fire or an explosion in a biological containment laboratory, any test under way would be immediately terminated upon discovery of the event, and appropriate safety measures would be taken to assure zero release of the infectious material or toxin while the fire was being contained. The proposed NBACC Facility will be fully equipped with fire suppression systems in accordance with NFPA requirements. If a fire intensified enough to cause structural damage to the biological safety cabinets and laboratory chambers, the heat would likely destroy any pathogen or toxin. Therefore, fire is not a credible hazard with regard to the potential release of infectious biological materials or toxins from the proposed NBACC Facility.

Similarly, an accidental aircraft crash is not a credible hazard with regard to the potential release of infectious biological materials or toxins from the proposed NBACC Facility. The probability that an accidental aircraft crash could strike the proposed NBACC Facility is very small but finite. Using an accident analysis procedure (U.S. Department of Energy, 1996), that probability was projected to be not more than once in approximately 38,000 years. The calculation included in-flight crashes (not associated with either landing or takeoff) of general aviation, commercial, and military aircraft. This is a conservative value (i.e., an overestimate), based on the estimated NBACC Facility building dimensions and maximum values of all model parameters; the probability of an accidental aircraft crash is likely to be considerably smaller. Furthermore, in the unlikely event of an accidental aircraft crash, the ensuing fire would likely destroy any pathogen or toxin.

6. POTENTIAL RISK TO THE PUBLIC FROM CONTACT WITH BIOSAFETY LABORATORY WORKERS

Members of the public may be concerned about potential inadvertent transmission of diseases from biosafety laboratory workers to other workers, family members, or the general public. Infectious agents may be transmitted through a variety of direct or indirect contacts with an infected individual. Understanding of the life-cycle of the specific infectious microorganism is critical in identifying the potential for transmission and means of mitigation. Some microorganisms require a vector (e.g., flea, tick, or rodent) to transmit the infectious agent from one person to another. Other infectious microorganisms are directly contagious from one person to another.

The countermeasures to prevent transmission of infectious agents are good hygiene and laboratory practice, vaccines, drugs, and vector control methods such as pesticides. The primary means of defense is to limit all contact with infectious microorganisms and insure that they are destroyed or inactivated while still in the laboratory. Training of personnel, management and oversight of laboratory operations, and medical surveillance of personnel are the principal components for preventing transmission of infectious agents. See Section 2.3.4 of the EIS for a discussion of these mitigation measures at the proposed NBACC Facility. As noted in Section 5.2.17.1 of the EIS, the limited number of documented cases of LAIs during the last 10 years in biomedical laboratories throughout the U.S. demonstrates the effectiveness of adherence to engineering controls and work practices to protect members of the public.

7. CUMULATIVE IMPACTS

The preceding hazard assessments apply to the proposed NBACC Facility as an individual entity. Similar hazard assessments were developed for the USAMRIID laboratories at Fort Detrick (USAMRMC, 2004) and the NIAID IRF currently in planning (NIH and USAG, 2003) and concluded that the evaluated risks to community health of their subject facilities, as individual entities, would be negligible. However, the cumulative risk to community health that would be posed by operation of USAMRIID laboratories, the NIAID IRF, and the proposed NBACC Facility, all in close proximity, has not been considered previously.

A. MAXIMUM CREDIBLE EVENT ANALYSES

Analyses of scenarios for potential release of highly infectious biological agents from a BSL-3 or BSL-4 laboratory to the atmosphere individually from the existing USAMRIID facilities, the NIAID IRF, currently under design, and the proposed NBACC Facility all showed no risk to community health from the respective MCE scenarios. These scenarios are comprised of sequence of unlikely mishaps – laboratory worker failing to properly use leakage safeguards on six of six centrifuge tubes (Section 1.A of this Appendix) or six of six centrifuge bottles breaking and the rotor gasket failing (Section 1.B of this Appendix).

The probability of either of these scenarios occurring simultaneously at two of the biodefense research facilities at the NIBC, let alone all three, is negligible. Even in that highly unlikely event, the individual impacts would be, at most, additive. The discharge stacks of the three facilities are hundreds of feet apart; therefore the downwind plumes would be parallel. Within these plumes, the ground level concentrations of a hypothetical released biological agent would be negligible at all points outside the boundaries of Fort Detrick. Accordingly, the cumulative risk to community health is negligible.

B. ESCAPE OF AN INFECTED ANIMAL

Analyses of potential escape of an infected animal (rodents and NHPs) individually from the existing USAMRIID facilities, the new USAMRIID Animal Facility, the NIAID IRF, currently under design, and the proposed NBACC Facility all showed negligible risk to community health. Simultaneous breakdowns of multiple layers of procedural controls and physical barriers would need to occur for an infected animal to escape.

The probability of infected animals escaping simultaneously from two or more of the biodefense research facilities at the NIBC is negligible. Even in that highly unlikely event, the individual impacts would be, at most, additive. Accordingly, the cumulative risk to community health is negligible.

C. BIOLOGICAL MATERIAL SHIPMENT

The collective risk to community health due to release of a biological agent from a shipment of infectious material to or from the existing USAMRIID Facility, the NIAID IRF, currently under design, and the proposed NBACC Facility, individually were deemed to be negligible. The multiple layers of engineering controls (packaging requirements) and procedural requirements, which will be employed during operations of the NBACC Facility, are designed to prevent the occurrence of such a release.

The probability of biological agents being released simultaneously from shipments of infectious material to or from two or more of the biodefense research facilities at the NIBC is negligible. Even in that highly unlikely event, the individual impacts would be, at most, additive in proportion to the number of shipments. Accordingly, the cumulative risk to community health is negligible.

D. TERRORIST ACTS

The hazard assessments for the existing USAMRIID Facilities, the NIAID IRF, currently under design, and the proposed NBACC Facility all noted that terrorist attacks are not evaluated in NEPA analyses. Although terrorist attacks may be credible threats, they are not reasonably foreseeable, and more importantly, potential terrorist acts are appropriately evaluated in a Vulnerability Assessment, which will not be available for public review. See Section 4 of this Appendix for details.

E. EXTERNAL ACTS

The risk to community health due to release of a biological agent resulting from external accidents and man-made or natural disasters was deemed to be negligible for the existing USAMRIID Facility, the NIAID IRF, currently under design, and the proposed NBACC Facility, individually. The multiple layers of engineering controls such as fire suppression systems and procedural safeguards such as emergency response procedures will prevent such a release. Furthermore, a fire or explosion of sufficient intensity to cause structural damage to a biological safety cabinet or a containment chamber would likely destroy any pathogen or toxin.

The probability of an external event of sufficient magnitude to affect two or more of the biodefense research facilities at the NIBC is negligible. Even in that highly unlikely event, the individual impacts would, at most, additive. For example, the probability of an accidental aircraft crash striking the proposed NBACC Facility was projected to be not more than once in approximately 38,000 years, as noted in Section 5 of this Appendix. The probability of an accidental aircraft crash striking the existing USAMRIID Facilities or the NIAID IRF, currently under design, would be similar based on the various building dimensions. A single accidental aircraft crash could not strike two or more buildings at the NIBC because the distances between buildings exceed the wingspan or fuselage length of military or commercial aircraft. Therefore, the probability of accidental aircraft crashes striking two or more buildings at the NIBC would be on the order of once in 10,000,000 years.

F. POTENTIAL RISK TO THE PUBLIC FROM CONTACT WITH BIOSAFETY LABORATORY WORKERS

Hazard analysis of the potential inadvertent transmission of diseases from biosafety laboratory workers at the proposed NBACC Facility to other workers, family members, or the general public were deemed to be negligible, as discussed in Section 6 of this Appendix. The multiple layers of procedural requirements, including training of personnel, management and oversight of laboratory operations, and medical surveillance of personnel, as well as countermeasures such as vaccines or drugs will mitigate risks from inadvertent transmission of etiologic agents.

The probability of inadvertent transmission of diseases via simultaneous public contact with biosafety laboratory workers from two or more of the biodefense research facilities at the NIBC is negligible. Even in that highly unlikely event, the individual impacts would be, at most, additive in proportion to the number of laboratory workers. Accordingly, the cumulative risk to community health is negligible.